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FALSE SCORPIONS OF THE GENUS *APOCHEIRIDIUM* CHAMBERLIN FROM WESTERN NORTH AMERICA (PSEUDOSCORPIONIDA, CHEIRIDIIDAE)

Ellen M. Benedict

Department of Biology/Environmental Sciences
Portland State University
Portland, Oregon 97207

ABSTRACT

New records, measurements, and morphometric ratios are provided for Chamberlin's western North American species: *Apocheiridium ferumoides, A. inexpectum* and *A. mormon*; and descriptions are given for three new species from Oregon: *A. bulbifemorum, A. granochelum* and *A. fergusoni*. A key to these six species is included.

INTRODUCTION

The family Cheiridiidae Chamberlin (Superfamily Cheiridioidea Chamberlin) with about one dozen genera from both hemispheres contains some of the smallest pseudoscorpions, with adults ranging in size from 1.0 to 1.8 mm (Vitali-di Castri 1966). The genus *Apocheiridium* Chamberlin, nearly cosmopolitan in distribution (Chamberlin 1931), includes the largest number of described species (Vitali-di Castri 1966) of any genus in the family. Only four species of *Apocheiridium* have been reported from the United States: *A. ferumoides* Chamberlin, *A. mormon* Chamberlin and *A. inexpectum* Chamberlin from the western states, and *A. stannardi* Hoff from the midwestern states. Chamberlin, in erecting the genus in 1924, noted that the four then-known species (*A. ferumoides, A. mormon, A ferum* (Simon) and *A. chamberlini* Godfrey) were "superficially very similar" and that "careful examination" was "necessary to distinguish them" (p. 34). This is no less true of the six species, now reported from the western states, since all share many characters in common.

This paper, one of a series resulting from studies originally centered upon pseudoscorpions collected in Oregon, is the first major report of the western species, *A. ferumoides, A. mormon* and *A. inexpectum*, since Chamberlin described them in 1924 and 1932. This study, based on the examination of Chamberlin's types and a number of other specimens, new and old, includes: new records, measurements and morphometric ratios for these little-known species, and descriptions of three new species. A key to these six species is provided. Measurements and morphometric ratios of the chela and chelal hand exclude the pedicel, while those of the femur include the pedicel.

GENUS *APOCHEIRIDIUM* CHAMBERLIN

Apocheiridium Chamberlin, 1924:34 (type species, *Apocheiridium ferumoides* Chamberlin); Beier, 1932:10; Hoff, 1952:192, 1958:19; Vitali-di Castri, 1966:379.

Individuals of the genus can be recognized by the following combination of characters (Chamberlin 1924; Hoff 1952; Vitali-di Castri 1966): posterior margin of carapace and tergites without posteriorly projecting tooth-like spurs or serrations, 11 tergites visible from dorsal view instead of 10, movable finger of chela of adult with a single tactile seta, and vestitural setae of body and pedipalps non-clavate. Since the western North American species share so many characters in common, the following generic description is given so that needless repetition can be avoided in the description of the three new species.

Description.—Based only on western North American species, including the type species. Body flat and robust (Chamberlin 1931, figs, 6, 66). Derm coarsely granulate on most surfaces except for smooth areas of sternites, coxae, trochanters of legs, chelicerae and pleural membranes. Investing setae simple and relatively straight to arcuate (Chamberlin 1931, fig. 47), with a single more or less developed submedial spine or tooth. Carapace subtriangular (Fig. 3); derm with rounded to stellate rugosities; one pair of corneate eyes located about three ocular diameter from anterior margin. Abdomen elliptical; derm of tergites heavily sclerotized with rounded to stellate rugosities, inter-tergal and intra-tergal membranes with smaller rugosities or granules; tergal scuta one to nine divided; derm of sternites relatively smooth and membranous, with some areas of pigmented reticulations in posterior and lateral portions of abdomen. Male genital area as illustrated by Chamberlin (1931, fig. 51); female genital area (Chamberlin 1931, fig. 52) with a small pair of long slender lateral cribriform plates and a single median plate, ovoid in shape and three times longer than lateral plates; spermathecae a pair of very long slender tubules with broad, elongate terminal enlargements.

Chelicerae (Chamberlin 1931, fig. 14) small; derm smooth; well-developed lamina exterior; hand with four setae, *b* toothed and *sb*, *is*, *es* simple; flagellum (Chamberlin 1931, fig. 15) of three unequal length blades; movable finger with a well-developed subapical lobe; galea (Chamberlin 1931, fig. 18) of male a broad triangular shaft with one or two tiny terminal rami, of female a series of three long, equal length rami arising individually from finger; serrula exterior with nine to 10 ligulate plates; serrula interior a weakly developed membranous velum; fixed finger with approximately three small marginal teeth.

Pedipalps slender to robust (Chamberlin 1924, figs. Z, AA); derm finely to coarsely granulate, except as noted; coarse granules extending well above the surface, especially on the trochanter and femur, becoming progressively lower and less numerous on tibia and base of chelal hand (number of coarse granules varying according to species); each finger (Chamberlin 1931, fig. 38) with a graded series of low, elongate retrorse teeth, becoming vestigal proximal to midpoint of finger.

Legs (Chamberlin 1931, fig. 44) somewhat stout; derm granulate except for smooth membranous-like surface of trochanters; dorsal surfaces of other podomers with low coarse tooth-like granules similar to those of palps, especially pronounced on femur of leg IV.

Remarks.—No doubt, many of these characteristics are typical of all species of *Apocheiridium.* However, since I have examined type specimens only of western North American species, this description is restricted to those species. Careful measurements must be taken in order to identify these distinctive but similar (appearing) species.

KEY TO ADULTS OF SPECIES OF *APOCHEIRIDIUM* CHAMBERLIN FROM WESTERN UNITED STATES

1. Chela length/tibia breadth ratio of male not more than 4.9, of female not more than 5.2 2
   Chela length/tibia breadth ratio of male 5.5-6.0 and of female 5.4-5.7 and chela length of male 0.43-0.49 mm, of female 0.48-0.53 mm; from Idaho and Oregon . . . . . *A. mormon* Chamberlin

2. Chela length less than 0.42 mm 3
   Chela length of male 0.44-0.47 mm, of female 0.47-0.54 mm and chela length/tibia breadth ratio of male 4.2-4.7, of female 4.3-4.9; from California and Oregon . . . . . *A. ferumoides* Chamberlin

3. Dorsum of chelal hand with a number of coarse granules, usually intermixed with moderately-sized or fine granules; from Oregon 4
   Dorsum of chelal hand very finely granulate to smooth, nearly lacking in granules and femur length/breadth ratio of male 4.3-4.6, of female 4.4-4.8; from southern California and Mexico . . . . . *A. inexpectum* Chamberlin

4. Proximal third (exclusive of pedicel) of femur more or less enlarged with medial margin nearly straight, or at most very shallow concavity (Figs. 2,4) 5
   Proximal third of femur bulging on both margins, markedly on lateral margin and noticeably on medial margin with distinct concavity on both margins distad of proximal "bulge" (Fig. 1); femur length of female 0.33 mm (male lacking) . . . . . *A. bulbifemorum* n. sp.

5. Femur length of male 0.27-0.28 mm, of female 0.27-0.29 mm and chela length of male 0.34-0.35 mm, of female 0.35-0.37 mm . . . . . *A. granochelum* n. sp.
   Femur length of male 0.33-0.35 mm, of female 0.35 mm and chela length of male 0.39-0.40 mm, of female 0.40 mm . . . . . *A. fergusoni* n. sp.

Apocheiridium bulbifemorum, new species
Figure 1

Specimen examined.—*Type record.* Oregon: Douglas Co.; 13 km S, 6 km E of Tiller (800 m), bark of *Pinus lambertiana* Dougl., 13 September 1973 (E. M. Benedict), 1 female (holotype AMNH).

Etymology.—The specific name is from the latin word *bulbus* which refers to the unusual end enlargement of the palpal femur.

Distribution.—Known only from Douglas County, Oregon.

Diagnosis.—Based on female, male unknown. Body length 1.31 mm, palpal femur length 0.32 mm; proximal third of femur (exclusive of pedicel) markedly bulging on both lateral and medial margins, femur length/breadth ratio 3.9; dorsum of chelal hand with a number of coarse granules intermixed with moderately sized ones.

Description.—Measurements in Table 1, morphometric ratios in Table 6. Carapace with stellate rugosities; chaetotaxy 4-16 (85±). Coxal chaetotaxy ?:2-3:2-4:2-2 or 3:2-4. Abdominal terga with stellate rugosities; chaetotaxy of terga 22:26:22:24:28:28:30:34:32:24:16:mm; of sterna 11:(0)9(0):(0)11(0):14:18?:21:24:19:13:mm. Chelicera typical of genus. Palp (Fig. 1) moderately slender except for enlargement of proximal third of

Table 1.—Measurements (in mm) of two new species of *Apocheiridium* Chamberlin from Oregon (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable)

	A. bulbifemorum	*A. fergusoni*	
	1 ♀	2 ♂♂	1 ♀
Body L	1.31	1.21-1.33	1.38
Abdominal B	0.72	0.69-0.72	0.76
Carapace L	0.38	0.38-0.40	0.43
Ocular B	0.20	0.21-0.22	0.24
Posterior B	0.50	0.45-0.47	0.52
Eye diameter	0.026	0.019	0.022
Chelicera L/B	0.09/0.05	0.08-0.09/0.05	0.08/?
Pedipalp			
Trochanter L/B	?/?	?-0.18/0.11-?	0.17/0.11
Femur L/B	0.33/0.08	0.33-0.35/0.08-0.09	0.35/0.08
Tibia L/B	0.27/0.09	0.27-0.28/0.08-0.09	0.29/0.09
Chela L/B	0.40/0.12	0.39-0.40/0.12	0.40/0.13
Hand L	0.18	0.18-0.20	0.22
Movable finger L	0.21	0.20-0.21	0.19
Leg I			
Entire femur L/D	?/?	0.19/0.07	0.19/0.07
Tibia L/D	?/?	0.12/0.05	0.10/0.05
Tarsus L/D	?/?	0.11/0.03	0.10/0.03
Leg IV			
Entire femur L/D	?/?	0.26/0.06	0.27/0.07
Tibia L/D	?/?	0.15-0.17/0.03-0.04	0.17/0.05
Tarsus L/D	?/?	0.11-0.13/0.03	0.09/0.03

femur; derm mostly coarsely granulate intermixed with moderately sized to fine granules; dentition appears typical of genus but number of teeth indeterminable due to orientation. Legs typical of genus.

Remarks.—This very unusual species is known only from the type locality.

Habitat.—Known only from sugar pine bark removed from a living tree.

Apocheiridium fergusoni, new species
Figure 2

Specimens examined.—*Type records.* Oregon: Harney Co.; 18 km SE of Riley (1300 m), bark of *Juniperus occidentalis* Hook., 15 May 1972 (E. M. Benedict), 1 male (holotype AMNH); Diamond Craters (1280 m), bark of *J. occidentalis*, 17 June 1973 (E. M. Benedict), 1 male (paratype EMB): Deschutes Co.; 19 km N of Bend, bark of *J. occidentalis*, 8 April 1937 (J. C. Chamberlin), 1 female, 1 nymph (paratypes JCC).

Etymology.—The specific name is a patronym in honor of Dr. Denzel Ferguson, Director of the Malheur Field Station, who has greatly encouraged my research efforts in southeastern Oregon.

Distribution.—Known only from eastern Oregon.

Diagnosis.—Based on adults only. Body length of male 1.21-1.33 mm, of female 1.38 mm; palpal femur length 0.33-0.35 mm; proximal third of femur (exclusive of pedicel) somewhat enlarged but bulging slightly *only* on lateral margin, medial margin relatively straight, femur length/breadth ratios 4.1-4.3; dorsum of chelal hand with numerous large granules intermixed with moderately sized ones.

Description.—Measurements in Table 1, morphometric ratios in Table 6. Carapace with generally stellate rugosities; holotypic chaetotaxy 4-15(97±). Coxal chaetotaxy 2-3-4:1 or

0-4:2-4:2-3 or 4:2-4. Abdominal terga with generally stellate rugosities; chaetotaxy of holotype 19:21:16:22:24:26:28:30:30:25:13?:mm; of sterna 6:(3-3):(0)2/8(0);(0)9(0); 13:15:19:21:23:18:6:mm. Chelicera typical of genus. Palp (Fig. 2) moderately slender except for moderately size enlargement of proximal third of femur; derm mostly coarsely granulate intermixed with moderately size fine granulations; finger with 10-12 teeth of typical generic facies. Legs of typical generic facies.

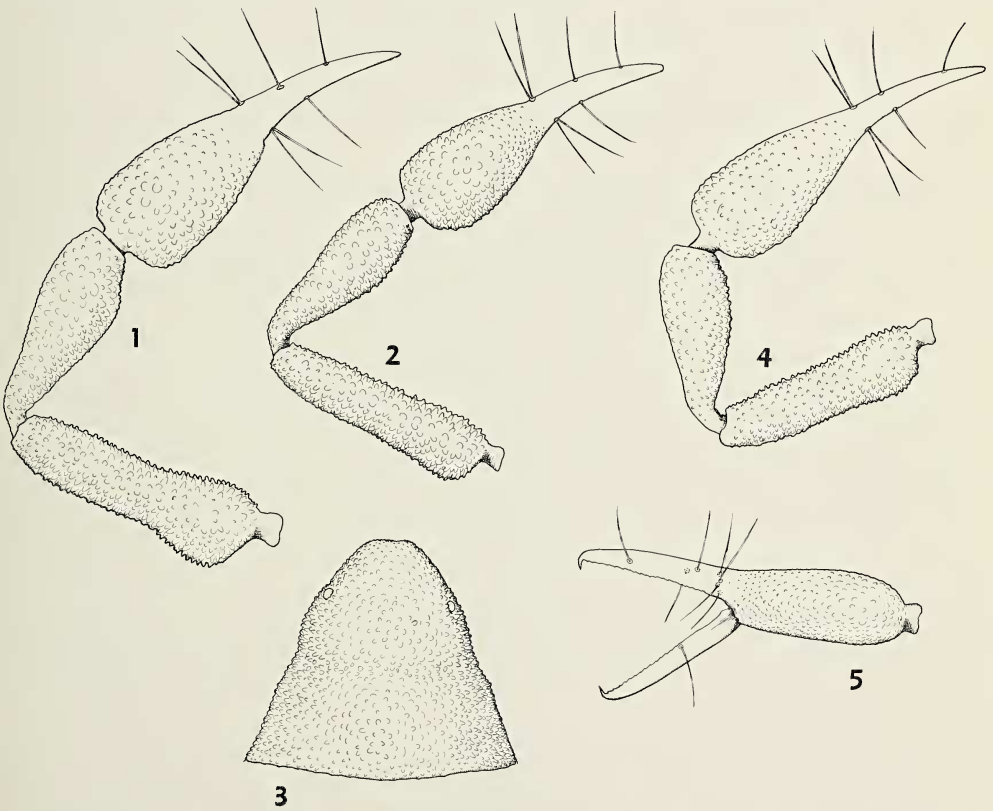
Remarks.—*Apocheiridium bulbifemorum* and *A. fergusoni* appear to be relatively similar in most characters except for the shape of the palpal femur. The medial margin of *A. fergusoni* is nearly straight and lacks a concavity above the exceedingly slight basal enlargement; in *A. bulbifemorum*, both margins are markedly swollen basally with a constriction just distal to the basal enlargement.

Habitat.—Known only from western juniper bark removed from a living tree.

Apocheiridium ferumoides Chamberlin

Apocheiridium ferumoides Chamberlin, 1924:34 (type species), 1931:238, 1932:139; Gering, 1956:49; Vestal, 1938:13.

Distribution.—Known from coastal areas between Morro Bay, California, and Astoria, Oregon. Gering (1956) listed it for the Great Salt Lake Desert in Utah, but its



Figs. 1-5.—New species of *Apocheiridium* from western North America: 1, *A. bulbifemorum*, dorsal aspect of pedipalp of holotype female; 2, *A. fergusoni*, dorsal aspect of pedipalp of holotype male; 3, *A. granochelum*, carapace of holotype female; 4, *A. granochelum*, dorsal aspect of pedipalp of holotype; 5, *A. granochelum*, lateral aspect of chela of holotype.

Table 2.—Measurements (in mm) of *Apocheiridium ferumoides* Chamberlin from the western United States (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable).

	12 ♂♂	8 ♀♀
Body L	1.35-1.46	1.48-1.77
Abdominal B	0.70-0.80	0.73-0.83
Carapace L	0.40-0.44	0.42-0.45
Ocular B	0.22-0.24	0.24-0.28
Posterior B	0.47-0.51	0.52-0.60
Eye Diameter	0.019-0.031	0.020-0.031
Chelicera L/B	0.08-0.10/0.04-0.06	0.08-0.10/0.05-0.07
Pedipalp		
Trochanter L/B	0.18-0.20/0.11-0.12	0.19-0.21/0.12-0.13
Femur L/B	0.32-0.39/0.08-0.10	0.36-0.39/0.09-0.11
Tibia L/B	0.27-0.31/0.10-0.11	0.30-0.33/0.10-0.11
Chela L/B	0.44-0.47/0.13-0.15	0.47-0.54/0.15-0.17
Hand L	0.21-0.24	0.23-0.24
Movable finger L	0.22-0.25	0.24-0.28
Leg I		
Entire femur L/D	0.18-0.20/0.06-0.08	0.19-0.21/0.06-0.07
Tibia L/D	0.17-0.19/0.04-0.05	0.19-0.20/0.04-0.06
Tarsus L/D	0.10-0.13/0.02-0.03	0.12-0.13/0.03-0.04
Leg IV		
Entire femur L/D	0.25-0.29/0.06-0.07	0.28-0.31/0.06-0.08
Tibia L/D	0.17-0.19/0.04-0.05	0.19-0.20/0.04-0.06
Tarsus L/D	0.14-0.17/0.02-0.04	0.15-0.17/0.03-0.04

presence there needs confirmation, since superficially similar species can easily be confused.

Diagnosis.—Based on adults only. Body length of male 1.35-1.46 mm, of female 1.48-1.77 mm; palpal femur length 0.32-0.39 mm; proximal third of femur (exclusive of pedicel) somewhat enlarged but bulging slightly only on lateral margin; medial margin relatively straight, femur length/breadth ratios 3.5-4.3; dorsum of chelal hand with a few coarse granules intermixed with numerous moderately sized ones.

Remarks.—Measurements in Table 2; morphometric ratios in Table 6. See Chamberlin (1931) for illustrations of various morphological parts (17 figures) of *A. ferumoides*. Chamberlin's (1924, 1932) description of the species is generally useful if considered in view of the characters provided herein for the genus and species. The new specimens, reported below, appear to be conspecific with the specimens described by Chamberlin, even though they exhibit a greater size range. Although *A. ferumoides* and *A. mormon* are about the same size, the palpal podomeres are much stouter in the former species than in the latter.

Habitat.—Chamberlin (1924, 1932) reported it from bark of eucalyptus, oak, cypress, pine and redwood trees; Vestal (1938) from the nests of woodrats; whereas, the new specimens, reported below, were collected from bark of Sitka spruce, Douglas fir and western red cedar trees.

Specimens examined.—California: Santa Clara Co.; Palo Alto, Stanford University Campus, bark of *Eucalyptus*, 17 January 1922 (J. C. Chamberlin), 3 males (holotype, 2 paratypes JCC), 3 females (allotype, 2 paratypes JCC); Stanford University campus, bark of *Eucalyptus*, 15 October 1922 (J. C. Chamberlin), 1 male, 1 female (paratypes JCC): San Mateo Co.; Atherton, bark of *Cupressus macrocarpa* Hartw. ex Gord., 23 October 1922 (J. C. Chamberlin), 4 females (JCC); Atherton, no data, 1 female (JCC): Alameda Co.; Berkeley, University of California campus, bark of *Eucalyptus*, 22 August 1921 (O. E. Essig), 1 male, 2 females (JCC): Berkeley, bark of *Eucalyptus, 7 October 1951 (W.*

C. Bentinck), 6 males, 2 females (ROS): San Luis Obispo Co.; Morro Bay, 16 April 1967 (P. Weygoldt), 1 male (WBM). Oregon: Clatsop Co.; Astoria, bark of *Picea sitchensis* (Bong.) Carr., 23 April 1936 (J. C. Chamberlin and K. W. Gray), 2 males, 2 females (JCC): Douglas-Lane Co. line; Coast highway, bark of *Pseudotsuga menziesii* (Mirb.) Franco, 26 April 1936 (J. C. Chamberlin), 1 male, 1 female (JCC): Lane Co.; near Glenada, 26 April 1937 (J. C. Chamberlin), 1 male (JCC): Lincoln Co.; 3 km N of Waldport, bark of *Thuja plicata* Donn, 14 March 1937 (J. C. Chamberlin and J. Schuh), 2 males, 2 females (JCC); 10 km E of Newport, bark of *Picea sitchensis*, 4-6 September 1946 (J. C. Chamberlin), 1 male, 1 female (JCC); 1 km NE of Elk City, bark of *P. sitchensis, 20 December 1971* (E. M. Benedict), 1 male, 1 female (EMB): Tillamook Co.; 3 km E of Oretown, bark of *P. sitchensis,* 12 March 1975 (E. M. Benedict), 1 nymph (EMB).

Apocheiridium granochelum, new species
Figures 3-5

Specimens examined.—*Type records.* Oregon: Benton Co.; Corvallis, bark of *Quercus* sp., 3 September 1937 (J. Schuh), 1 female (holotype AMNH), 1 male (allotype AMNH), Corvallis, bark of *Quercus* sp., 9 March 1937 (J. Schuh), 1 female (paratype JCC): Columbia Co., Scappoose, bark of *Fraxinus latifolia* Benth., 19 February 1937 (K. W. Gray and J. Schuh), 2 males, 2 females (paratypes JCC).

Etymology.—The specific name refers to the granular nature of the chelal hand.

Distribution.—Known only from Benton and Columbia Counties, Oregon.

Diagnosis.—Based on adults only. Body length of male 0.89-1.09 mm, of female 0.94-1.22 mm; palpal femur length 0.27-0.29 mm; proximal third of femur (exclusive of pedicel) somewhat enlarged but not especially bulging on medial or lateral margins, femur length/breadth ratios 3.8-4.1; dorsum of chelal hand with a number of coarse granules intermixed with fine ones.

Description.—Measurements in Table 3, morphometric ratios in Table 7. Carapace (Fig. 3) with generally roundish rugosities; chaetotaxy 4-17(85±). Coxal chaetotaxy 2-2-5:2-2

Table 3.—Measurements (in mm) of *Apocheiridium granochelum*, new species from Oregon (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable).

	3 ♂♂	4 ♀♀
Body L	0.89-1.09	0.94-1.22
Abdominal B	0.54-0.57	0.59-0.64
Carapace L	0.33-0.35	0.34-0.36
Ocular B	0.18-0.20	0.19-0.20
Posterior B	0.36-0.40	0.38-0.42
Eye diameter	0.020-0.025	0.019-0.020
Chelicera L/B	?-0.07/0.04-?	?/?
Pedipalp		
Trochanter L/B	0.15-0.17/0.08-0.09	0.15-0.16/0.09-0.10
Femur L/B	0.27-0.28/0.07	0.27-0.29/0.06-0.07
Tibia L/B	0.23-0.24/0.07	0.22-0.23/0.07-0.08
Chela L/B	0.34-0.35/0.09-0.10	0.35-0.37/0.10-0.11
Hand L	0.16-?	0.18-0.19
Movable finger L	0.19-?	0.18-0.19
Leg I		
Entire femur L/D	0.14-0.14/0.05-0.06	0.15-0.16/0.05-0.06
Tibia L/D	0.10/0.03-0.04	0.10-0.11/0.04-0.05
Tarsus L/D	0.10/0.02-0.03	0.09-0.10/0.02-0.03
Leg IV		
Entire femur L/D	0.20-0.21/0.05-0.06	0.20-0.21/0.05-0.06
Tibia L/D	0.14-0.15/0.03-0.04	0.14-0.15/0.03-0.04
Tarsus L/D	0.11-0.12/0.02-0.03	0.11-0.13/0.02-0.03

or 3:2-3:2-3:2-5. Abdominal terga with generally roundish rugosities; chaetotaxy of holotype 22:22:20:22:28:31:32:30:29:26:12:mm, of sterna 13:(0)9(0):(0)13(0);16:14?:22:22:21:15:8:mm. Chelicera typical of genus. Palp (Fig. 4) relatively slender except for very slight enlargement of proximal third of femur, both margins slightly concave distad of enlargement; derm coarsely granulate intermixed with fine granules; fingers each with 10-12 teeth of typical generic facies. Legs of typical generic facies.

Remarks.—Although *A. inexpectum* and *A. granochelum* resemble each other superficially and are about the same size, the derm of the chelal hand in *A. granochelum* is markedly granular, the hand is more swollen interiorly, and the femur is broader basally than in *A. inexpectum*. Also, the two species appear to be isolated geographically, since *A. inexpectum* is known to occur from southern California to Baja California, while *A. granochelum* has been collected only from western Oregon.

Habitat.—Known only from Oregon ash and oak bark removed from living trees.

Apocheiridium inexpectum Chamberlin

Apocheiridium ferumoides Chamberlin, 1924:34 (in part, misidentification).
Apocheiridium inexpectum Chamberlin, 1932:138; Beier, 1932:11.

Distribution.—Known only from Monterey, San Bernardino, Riverside and Imperial Counties of southern California (United States), and Baja California (Mexico).

Diagnosis.—Based on adults only. Body length of male 1.03-1.16 mm, of female 1.08-1.24 mm; palpal femur length 0.28-0.31 mm; proximal third of femur (exclusive of pedicel) somewhat enlarged but bulging slightly only on lateral margin; medial margin relatively straight, femur length/breadth ratios 4.3-4.8; dorsum of chelal hand very finely granulate to nearly smooth, coarse granules nearly absent.

Table 4.—Measurements (in mm) of *Apocheiridium inexpectum* Chamberlin from California (Abbreviations: B=breadth; D=depth; L=length).

	5 ♂♂	8 ♀♀
Body L	1.03-1.16	1.08-1.24
Abdominal B	0.57-0.61	0.59-0.69
Carapace L	0.33-0.39	0.35-0.38
Ocular B	0.18-0.20	0.19-0.21
Posterior B	0.38-0.41	0.40-0.45
Eye Diameter	0.024-0.025	0.022-0.025
Chelicera L/B	0.07-0.08/0.03-0.04	0.07-0.08/0.03-0.04
Pedipalp		
Trochanter L/B	0.13-0.14/0.08-0.09	0.14-0.16/0.08-0.09
Femur L/B	0.28-0.30/0.06-0.07	0.29-0.31/0.06-0.07
Tibia L/B	0.24-0.26/0.07-0.08	0.25-0.27/0.07-0.08
Chela L/B	0.35-0.37/0.09-0.10	0.35-0.38/0.09-0.11
Hand L	0.17	0.14-0.19
Movable finger L	0.19	0.19-0.20
Leg I		
Entire femur L/D	0.15-0.16/0.05-0.06	0.17-0.18/0.05-0.06
Tibia L/D	0.10-0.11/0.03-0.04	0.10-0.11/0.03-0.04
Tarsus L/D	0.10-0.11/0.02-0.03	0.10-0.11/0.02-0.03
Leg IV		
Entire femur L/D	0.20-0.21/0.05-0.06	0.21-0.23/0.06-0.07
Tibia L/D	0.13-0.14/0.03-0.04	0.16-0.17/0.03-0.04
Tarsus L/D	0.12-0.13/0.02-0.03	0.12-0.13/0.02-0.03

Remarks.–Measurements in Table 4; morphometric ratios in Table 7. Chamberlin (1932:138, 140) and Beier (1932:11, 13) both give the same inconsistent ratios for femur length/breadth as follows: "3.8-3.9" (in description) and "4.3-4.4" (in key). The latter range is consistent with my measurements of 15 specimens (Table 7). Unfortunately, most of the specimens were KOH treated and mounted nearly whole so that measurements and, in turn, ratios are rough approximations for some podomeres.

Habitat.–known from eucalyptus, mesquite and sycamore bark.

Specimens examined.–California: Riverside Co.; Beaumont, bark of *Eucalyptus*, 11 November 1925 (J. C. Chamberlin), 3 males (holotype, 2 paratypes JCC), 2 females (allotype, 1 paratype JCC); Box Springs Grade near Riverside, bark of sycamore, 26 November 1925 (J. C. Chamberlin), 2 males, 6 females (paratypes JCC): Imperial Co., Midway Well, bark, 27 January 1965 (R. O. Schuster), 3 males, 2 females (ROS): Monterey Co.; Los Baños above Gonzales, sycamore bark, 28 March 1935 (J. C. Chamberlin and G. York), 2 females (JCC): San Bernadino Co., 2.5 km N of Cajon Pass, 12 June 1960 (H. L. McKenzie), 1 male (ROS).

Apocheiridium mormon Chamberlin

Apocheiridium mormon Chamberlin, 1924:34, 1932:138.

Distribution.–Known only from Bear Lake County, Idaho, and Benton County, Oregon.

Diagnosis.–Based on adults only. Body length of male 1.30-1.35 mm, of female 1.38-1.40 mm; palpal femur length of male 0.33-0.39 mm, of female 0.40-0.44 mm; proximal third of femur (exclusive of pedicel) only slightly enlarged, both margins relatively straight, femur length/breadth ratios 4.6-4.9; dorsum of chelal hand with a number of coarse granules intermixed with moderately sized ones.

Remarks.–Measurements in Table 5; morphometric ratios in Table 7. This species is unique among western North American species for its slender pedipalps. Both margins of

Table 5.–Measurements (in mm) of *Apocheiridium mormon* Chamberlin from Idaho and Oregon (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable).

	3 ♂♂	3 ♀♀
Body L	1.30-1.35	1.38-1.40
Abdominal B	0.64-0.71	0.77-0.81
Carapace L	0.38-0.42	0.45-0.46
Ocular B	0.21-0.25	0.23-0.24
Posterior B	0.45-0.47	?
Eye diameter	0.022-0.025	0.025-0.026
Chelicera L/B	0.08-0.09/0.04-0.05	0.09-0.10/0.04-0.05
Pedipalp		
Trochanter L/B	0.17-0.19/0.08-0.10	0.20-0.21/0.12-0.13
Femur L/B	0.33-0.39/0.07-0.08	0.40-0.44/0.08-0.09
Tibia L/B	0.28-0.32/0.07-0.08	0.34-0.35/0.08-0.09
Chela L/B	0.43-0.49/0.11-0.12	0.48-0.53/0.13-0.14
Hand L	0.22-0.23	0.23-0.25
Movable finger L	0.24-0.25	0.26-0.29
Leg I		
Entire femur L/D	0.18-0.20/0.05-0.06	0.20-0.22/0.06-0.07
Tibia L/D	0.11-0.12/0.03-0.04	0.13-0.14/0.04-0.05
Tarsus L/D	0.12-0.13/0.02-0.03	0.12-0.14/0.03-0.04
Leg IV		
Entire femur L/D	0.25-0.27/0.05-0.06	0.29-0.31/0.06-0.07
Tibia L/D	0.17-0.18/0.04-0.05	0.20-0.21/0.04-0.05
Tarsus L/D	0.13-0.15/0.03-0.04	0.16-0.17/0.03-0.04

Table 6. Morphometric ratios of three species of *Apocheiridium* Chamberlin from western North American (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable).

	A. bulbi-femorum	*A. fergusoni*		*A. ferumoides*	
	1 ♀	2 ♂♂	1♀	12 ♂♂	8 ♀♀
Pedipalp					
Femur L/B	3.9	4.1-4.3	4.2	3.5-4.1	3.5-4.3
Tibia L/B	3.0	3.1-3.2	3.1	2.6-3.0	2.7-3.0
Chela L/B	3.2	3.2-3.3	3.0	3.1-3.5	3.0-3.4
Movable finger L/ Hand L	1.1	1.1-1.2	?	1.0-1.2	1.0-1.2
Hand L/B	1.7	1.4-1.5	?	1.5-1.7	1.5-1.7
Chela L/Tibia B	4.5	4.5-4.6	4.3	4.2-4.7	4.3-4.9
Leg I					
Entire femur L/D	?	2.8-2.9	?	2.4-3.0	2.6-3.2
Tibia L/D	?	2.6	?	2.3-2.8	2.4-2.6
Tarsus L/D	?	2.2-2.3	?	3.3-4.6	3.4-3.9
Leg IV					
Entire femur L/D	?	4.1-4.3	?	3.5-4.1	3.8-4.1
Tibia L/D	?	3.7-3.8	?	3.5-4.3	3.6-3.8
Tarsus L/D	?	3.7-3.8	?	3.4-4.5	4.1-4.5

Table 7.–Morphometric ratios of three species of *Apocheiridium* Chamberlin from western North America (Abbreviations: B=breadth; D=depth; L=length; ?=indeterminable).

	A. granochelum		*A. inexpectum*		*A. mormon*	
	3 ♂♂	4 ♀♀	5 ♂♂	8 ♀♀	3 ♂♂	3 ♀♀
Pedipalp						
Femur L/B	3.8-4.0	3.8-4.1	4.3-4.6	4.4-4.8	4.6-4.9	4.6-4.8
Tibia L/B	3.0-3.3	2.9-3.1	3.3-3.5	3.1-3.6	3.6-3.8	3.7-3.8
Chela L/B	3.3-3.6	?	3.5-3.7	3.3-3.6	4.1-4.3	3.6-3.9
Movable finger L/ Hand L	1.2-?	1.0-?	1.1-1.2	1.1-1.2	1.1-1.2	1.1-1.2
Hand L/B	1.6-?	1.7	1.7-1.8	1.6-1.8	1.8-1.9	1.7-1.9
Chela L/Tibia B	4.6-4.8	4.4-4.8	4.7-4.9	4.7-5.1	5.5-6.0	5.4-5.7
Leg I						
Entire femur L/D	2.8	?	?-2.9	2.9-3.0	2.9-3.3	3.1-3.2
Tibia L/D	2.5-2.9	2.2-2.5	2.6-2.7	2.7-2.8	3.0-3.1	2.9-3.1
Tarsus L/D	4.0	3.5-3.8	?-4.2	3.5-?	4.0-4.2	3.9-4.0
Leg IV						
Entire femur L/D	3.8	3.6-3.8	3.7-4.2	3.4-3.6	4.0-4.3	4.3-4.6
Entire femur L/D	3.8-4.2	3.8-4.2	3.8-4.0	4.1-4.4	4.1-4.4	4.9-5.0
Tarsus L/D	3.8-4.4	4.2-4.3	?	4.3-4.6	4.5-4.7	4.8-5.1

the femur are relatively straight with a very shallow concavity only on the lateral margin (see Chamberlin 1924, fig. Z). Chamberlin described *A. mormon* from a single male specimen from Idaho and, until now, no new specimens have been reported for the species. The Oregon specimens agree in detail with the holotype but are slightly larger in some podomeres. The listings of this species by Chamberlin (1924, 1932), Beier (1932) and Hoff (1958) for Utah have not been supported by collection records or specimens. Therefore, while *A. mormon* likely occurs in Utah, its presence there needs verification.

Habitat.–Known from bark of a mountain mahogany, an oak and an old fence post.

Specimens examined.–Idaho: Bear Lake Co.; Fish Haven, bark of *Cercocarpus*, 8 September 1921 (J. C. Chamberlin), 1 male (holotype JCC). Oregon: Benton Co.; Granger, bark of fence post, 16 February 1938 (J. C. Chamberlin and K. W. Gray), 2 males, 2 females (JCC); Corvallis, bark of *Quercus* sp., 3 March 1937 (J. Schuh), 1 female (JCC).

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